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Exchange Sex and HIV Infection Among Women Who Inject Drugs—20 US Cities, 2009

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Abstract

Background—Women who inject drugs and who also exchange sex are at increased risk for HIV infection, but data on this population in the United States remain sparse.

Methods—This study assessed the prevalence of exchanging sex for money or drugs among women who inject drugs using data from the 2009 US National HIV Behavioral Surveillance (NHBS) system. Prevalence of being HIV-positive (testing positive in NHBS), HIV-positive–unaware (reporting being HIV-negative or unknown status but testing positive in NHBS), and risk behaviors and use of services were compared between women who did and did not exchange sex. The association between exchange sex and being HIV-positive–unaware of the infection was examined using multivariate Poisson models with robust standard errors.

Results—Among 2305 women who inject drugs, 39% reported receiving things like money or drugs from ≥1 male partners in exchange for oral, vaginal, or anal sex in the previous 12 months. Women who exchanged sex were more likely to be unemployed, homeless, lack health insurance, have multiple condomless vaginal or anal sex partners, and receptively share syringes. In multivariate analysis, exchange sex was associated with being HIV-positive–unaware (adjusted prevalence ratio 1.97, 95% confidence intervals: 1.31 to 2.97).

Conclusions—Prevalence of exchange sex was high in this population. Women who exchange sex were more likely to be socially disadvantaged, report sexual and injection risk, and be HIV-positive–unaware. They represent an important group to reach with HIV prevention, testing, and care services.

Keywords

exchange sex; PWID; prostitution; undiagnosed HIV; sex work

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INTRODUCTION

Injection drug use accounted for 6% of the 44,784 estimated new HIV diagnoses in the United States (The United States and 6 dependent areas: American Samoa, Guam, the Northern Mariana Islands, Puerto Rico, the Republic of Palau, and the US Virgin Islands) in 2014.[1] Although the number of HIV diagnoses attributed to injection drug use declined from 2010–2014, HIV prevalence remains high among people who inject drugs (PWID), in particular among racial/ethnic minorities.[2,3] There is also evidence of increasing drug use and associated HIV transmission in rural areas where HIV prevention services may be scarce.[4] HIV among PWID can be acquired through unsafe injection or sex practices.[5] Sex in exchange for money, drugs, or other items, which is prevalent among women who inject drugs,[6-8] may confer an additional risk.

Behavioral, biological, and structural factors place women who exchange sex at risk for HIV acquisition, as they have high numbers of sex partners, concurrent partners, and may have difficulties in negotiating condom use if they are in a position of economic hardship, drug dependency, or facing threats of violence.[9-13] Sexually transmitted diseases are prevalent among those who exchange sex,[14,15] as are several socioeconomic factors that increase vulnerability to HIV infection,[16-18] including poverty, low education, and unstable housing.[10,17,19-21] These factors, together with stigma, create barriers to treatment and prevention services.

It has been documented in many parts of the world that female sex workers have high HIV prevalence;[9,22] however, data are limited in the United States. A recent systematic review documented only 14 studies in the United States that reported HIV prevalence among sex workers, with estimates ranging from 0.3% to 30% and an average prevalence of 17.3% [95% confidence interval (CI): 13.5% to 21.9%].[23] Most are decades old, only 3 present data beyond a single city or state, and the majority used convenience sampling. Findings regarding HIV prevalence specifically among women who inject drugs are inconsistent: A longitudinal case–control study among PWID in San Francisco found that women who traded sex for money in the past year were 5.1 times more likely to become HIV infected,[8] whereas other studies among PWID have found that exchange sex was not associated with being HIV positive,[24] or that this association was only seen for women with large numbers of partners.[6]

There is a need to better understand the prevalence of exchange sex and its association with HIV infection among women who inject drugs in the United States, to inform prevention and care. People who are HIV positive but unaware of their status are more likely to engage in behaviors that contribute to HIV transmission, compared with those who are aware; therefore, determining HIV awareness among this group is also a priority.[25]

NHBS monitors HIV prevalence and associated behaviors in US cities through surveys and HIV testing in populations at high risk of HIV infection, including PWID. Using NHBS data, we document the prevalence of exchange sex among sexually active women who inject drugs, describe the characteristics and risk behaviors of women who exchange sex, and

determine whether exchange sex is associated with 2 different outcomes, HIV prevalence and being HIV-positive but unaware of one's status.

METHODS

Data were collected in the second cycle of NHBS among PWID in 2009. NHBS methods are described in detail elsewhere.[26,27] Briefiy, data collection was conducted in 20 US metropolitan statistical areas with >500,000 population; approximately, 60% of the nation's AIDS cases were reported in these cities in 2009.[28] Formative research was conducted to inform survey implementation.[29] Participants were recruited using respondent-driven sampling (RDS),[27,30] beginning with a limited number of "seed" participants, purposefully chosen through formative research. Persons were eligible if they injected drugs in the previous 12 months and were aged ≥18 years, residents of the city, able to complete the survey in English or Spanish, and to provide informed consent. Self-reported drug injection in the previous 12 months was confirmed by observation of physical evidence of recent injection, and by assessing knowledge of injection practices. Trained interviewers administered a standardized questionnaire, using computers. HIV testing was performed on blood or oral specimens with rapid or laboratory-based testing and confirmed with Western blot or immunofluorescence. Participants could recruit up to 5 people they knew who inject drugs. Participants were offered incentives for completing the survey, taking an HIV test and for recruiting others (typically 25, 25, and 10 USD per recruit). All NHBS activities are anonymous.

Measures

We examined 2 main outcomes, HIV prevalence and the prevalence of being HIV-positive but unaware of one's infection (HIV-positive–unaware). A nonreactive rapid test was considered a definitive negative result. Women were considered to be HIV positive if they had a laboratory-confirmed–positive HIV test result. Of these, women who did not report having previously tested positive for HIV were considered to be HIV-positive–unaware.

Exchange sex was used as a dichotomous variable and defined as reporting one or more male partners in the previous 12 months that the participant had oral, vaginal, or anal sex with in return for receiving "things like money or drugs." Homelessness was defined as "living on the street, in a shelter, a Single Room Occupancy hotel (SRO), temporarily staying with friends or relatives, or living in a car," currently or in the previous 12 months. Incarceration history was defined as having been arrested by the police and booked in the previous 12 months. Other variables have been defined in detail elsewhere.[31]

Analysis

Analyses were limited to data from participants who self-reported female sex (not male or transgender), completed the interview, reported at least 1 male partner in the previous 12 months, and had a positive or negative HIV test result. We determined the overall prevalence of exchange sex, and in bivariate analyses we compared the prevalence of exchange sex by sociodemographic characteristics and city. We also compared substance use, sexual risk behaviors, and use of services by whether participants exchanged sex. Poisson models with

robust standard errors, as described below, were used to determine statistical significance for categorical variables, and to test differences in mean values for the total number of oral, vaginal, or anal sex partners in the previous 12 months. A nonparametric exact test was used to test for differences in medians for the total number of oral, vaginal, or anal sex partners in the previous 12 months.

We examined bivariate associations between exchange sex and the outcomes HIV prevalence and HIV-positive–unaware. Participants aware of being HIV positive (n = 112) were excluded from bivariate and multivariate analyses of the HIV-positive–unaware outcome. In multivariate analysis, we examined the association between exchange sex and being HIV-positive–unaware, and added other variables that, based on previous research, could be potential confounders. Variables were added one by one, starting with the variable with the lowest *P* value for the association with HIV-positive–unaware in bivariate analysis (data not shown). Variables examined included age, race/ethnicity, education, homelessness, arrest history, poverty, and several injection related variables (duration, frequency of injection, receptive syringe sharing, and drug most commonly injected). A correlation matrix revealed that the correlation coefficient was no higher than 0.41 between any 2 potential covariates. Variables with $P < 0.1$ were retained in the model. We tested for 2-way interactions between exchange sex and each of the covariates in the final model. To evaluate a possible association between exchange sex and HIV-positive–unaware that could not be explained by a higher number of sex partners, we performed a sensitivity analysis, introducing the total number of condomless vaginal and anal sex partners in the previous 12 months as a categorical variable in the model.

For bivariate and multivariate analysis, we used generalized estimating equations, using a Poisson model with a robust standard error in PROC GENMOD in SAS v. 9.3. To account for the sampling design, in calculating *P* values and unadjusted and adjusted prevalence ratios and 95% CIs, we did the following[32]: We clustered the model on recruitment chain[33,34] to account for the general dependence among observations linked to one another in population networks; we adjusted for homophily and the direct dependence among the recruiter and recruit by including the recruiters value on the model outcome, (ie, “yes,” “no” or “non-applicable” if missing) as a fixed effect in the model; and we adjusted for the differing sample inclusion probabilities by including participants’ self-reported personal network size in the model as a fixed effect. In multivariate analysis, we also accounted for the multisite nature of the study by including an indicator variable for city as a fixed effect in the models. The data were not weighted for the RDS sampling method; thus, all estimates are sample estimates and may not be representative of the underlying population.

Ethics

Verbal informed consent was obtained from all participants. NHBS activities were approved by local institutional review boards in participating cities. The study protocol was also reviewed and approved by the Centers for Disease Control and Prevention.

RESULTS

In total, 2814 women were interviewed and tested for HIV. We excluded 476 who did not report sex with male partners in the previous 12 months, and an additional 33 with missing data on exchange sex, who self-reported being HIV positive but tested negative, or for whom the interviewer did not have confidence in their answers. Of the 2305 women included, 903 (39.2%) reported exchanging sex in the previous 12 months (Table 1). City-specific sample estimates ranged from 21.2% (Nassau-Suffolk) to 68.8% (Miami, Fig. 1). Among women who exchanged sex, 545 (60.4%) had 1 exchange partner; 280 (31.0%) had ≥10; and 78 (8.6%) had ≥100 exchange partners in the previous 12 months (data not shown). Exchange sex was more common among socioeconomically disadvantaged women; 41.7% of those with less than high school education exchanged sex, compared with 34.6% of women with some college or above ($P = 0.03$, Table 1). Exchange sex was also more common among women who were unemployed (40.7% vs. 26.7% for those employed, $P < 0.001$), homeless (48.7% vs. 24.8% for those not homeless, $P < 0.0001$), or who had been incarcerated (50.1% vs. 34.0% for those who had not, $P < 0.0001$). Almost half of the women were aged 45 or older. Among women who were HIV positive and aware, 40.2% reported exchange sex, compared with 55.6% of women who were HIV-positive–unaware. Among women who tested HIV negative, 38.5% reported exchange sex ($P = 0.01$).

Compared with those who did not exchange sex, women who exchanged sex reported more male oral, vaginal, or anal sex partners (mean 63.3 vs. 2.6, $P < 0.001$, Table 2). Among women who exchanged sex, 18.8% had ≥10 condomless vaginal sex partners in the previous 12 months compared with 1.0% among those who did not exchange. Of those who exchanged sex, 12.5% had more than 1 condomless anal sex partner in the previous 12 months compared with 3.1% of those who did not exchange ($P < 0.0001$). Among women who exchanged sex, the most recent partner was more likely to have an HIV status unknown to the participant (67.4% vs. 33.7%, $P < 0.0001$). Women who exchanged sex were more likely to report having, receptively, shared syringes in the previous 12 months (56.0% vs. 33.4%, $P < 0.0001$), and to having been told that they had an sexually transmitted disease in the previous 12 months (19.6% vs. 8.7%, $P < 0.0001$). There was no significant difference in the proportion who had an HIV test in the previous 12 months (55.1% vs. 52.2%, $P = 0.46$). Among women who tested in the previous 12 months, there was little difference in not obtaining the test results (7.6% among those who exchanged vs. 5.6% for those who did not exchange, $P = 0.17$).

HIV Prevalence

In total, 10.0% of women who exchanged sex tested positive for HIV, compared with 7.4% of those who did not exchange sex. The association between exchange sex and HIV prevalence was not statistically significant in bivariate analysis ($P = 0.33$).

HIV-Positive–Unaware

Five percent of women who exchanged sex were HIV-positive–unaware, compared to 2.6% among those who had not exchanged sex ($P = 0.01$, Table 2). Among HIV-positive women, half of those who exchanged sex were unaware of their infection compared to 35% among

those who did not exchange sex. In bivariate analysis, excluding those who self-reported being HIV-positive (n = 112 plus one participant missing data on previous test result), exchange sex was associated with being HIV-positive–unaware (prevalence ratio 1.80, 95% CI: 1.29 to 2.51). In multivariate analysis, controlling for age, race/ethnicity, education, homelessness, and city of interview, exchange sex remained associated with being HIV-positive–unaware (adjusted prevalence ratio 1.97, 95% CI: 1.31 to 2.97) (Table 3).

The interaction terms between exchange sex and each covariate in the final model were not significant and were not retained in the final model. In sensitivity analysis, when adjusting for the total number of condomless vaginal and anal sex partners in the final model, the association between exchange sex and HIV-positive–unaware remained significant (Table 3).

DISCUSSION

In this analysis of more than 2300 women who inject drugs from 20 geographically diverse US cities, 2 out of every 5 reported exchanging sex for money or drugs in the previous 12 months, ranging from 21.2% to 68.8% across the different cities. Exchange sex was associated with socioeconomic disadvantage, including unemployment, homelessness, incarceration, and being uninsured. HIV prevalence did not differ significantly by history of exchanging sex; however, a key finding of this study is that women who exchanged sex were more likely to be HIV positive but unaware of their infection. Ten percent of those who exchanged sex were HIV positive, half of which were unaware of their infection, posing an important public health challenge for HIV prevention in this highly vulnerable population of women.

Although HIV prevalence among women who exchanged sex in our study is lower than that reported in a systematic review of US studies among female sex workers (17.3%),[23] most studies in that review were conducted in the 1990s. Furthermore, our findings may not be directly comparable as all women in our sample injected drugs and 60% only exchanged sex with a single partner.

Our study found that HIV prevalence did not differ by history of exchanging sex, whereas the percentage HIV-positive–unaware did. This may be related to some women refraining from exchanging sex once diagnosed with HIV, either due to adopting safer behaviors once they become aware of their status[25] or due to fear of laws that criminalize potential HIV exposure—in particular in the context of prostitution law.[35] This is supported by the fact that exchange sex was more common among HIV-positive–unaware women compared with those aware. If women who receive an HIV diagnosis cease exchanging sex, and women who start exchanging sex have lower HIV prevalence, such population turnover could lead to an underestimate of the true burden of HIV among those who exchange sex.[22] In addition, women who have only recently started exchanging sex may have become infected with HIV, but not yet diagnosed. Another explanation for our findings could be that women who were previously diagnosed with HIV may not have disclosed being aware of their status because of fear of stigma or concerns about negative consequences in the context of HIV criminalization laws;[35] thus, our study may have overestimated the number of women who were HIV-positive–unaware among those who exchange sex. Likewise, women who are HIV

positive may have been less likely to disclose that they exchange sex for similar reasons, which could have biased the association between exchange sex and HIV prevalence toward the null.

The association between exchange sex and being HIV-positive–unaware remained significant even after controlling for the number of condomless vaginal and anal sex partners, which suggests that other factors, including the partners' characteristics, are important for HIV acquisition risk. In our study, women who exchanged sex were more likely to have a sex partner of unknown HIV status, and studies elsewhere have found higher HIV prevalence among clients of female sex workers compared with the general population.[36,37]

In our study, all women who injected drugs and indicators of socioeconomic hardship were common. However, consistent with previous research,[17,19] low education attainment, unemployment, and homelessness were even more common among women who exchanged sex. Women may have begun exchanging sex as a result of few other means of earning income.[38] As prostitution and drug use are illegal in most US states, women who engage in these practices face increased rates of incarceration. A criminal record introduces additional barriers to obtaining housing, social benefits, and legal employment.[39,40] Laws that criminalize prostitution together with policing practices may inadvertently force women toward more unsafe locations to exchange sex and introduce barriers to HIV prevention. These challenges suggest that interventions for women who exchange sex need to address the broader context within which these practices take place and include socioeconomic support, housing, and long-term alternative economic opportunities.[12,40]

Drug dependency may influence women to accept risky clients and be less empowered to negotiate safe sex,[12] and can also create a barrier to seeking and maintaining employment as an alternative to exchanging sex.[41,42] Another important component of effective HIV prevention for women who inject drugs and exchange sex is access to substance use disorder treatment, including counseling and medication-assisted therapy.[43,44]

Current Centers for Disease Control and Prevention guidelines recommend that persons at high risk for HIV infection, including PWID and those who exchange sex, should be tested at least once every 12 months;[45] however, 45% of women in our study who exchanged sex reported not receiving an HIV test in the previous 12 months. Although all women who inject drugs should be tested annually, women who exchange sex in particular would benefit from increased access to and frequency of HIV testing. Although the Presidential Advisory Council on HIV/AIDS called for an end to federal and state HIV-specific criminal laws and prosecutions in 2013,[46] fear of HIV-related criminalization in the context of selling sex may still deter women from getting tested for HIV.

Women who test positive for HIV should be linked to care, whereas those who test negative could benefit from pre-exposure prophylaxis, which is recommended for women who engage in commercial sex work.[47] One opportunity to increase testing and linkage to care or prevention services could be for providers to inquire about factors that increase HIV risk, such as exchange sex and injection drug use, and offer testing at every health care encounter

—three quarters of women in our sample had visited a health care provider in the previous 12 months but not all had been HIV tested. Previous data show that having visited a health care provider in the previous 12 months was associated with having been tested for HIV.[48] Syringe services programs could also be sources of comprehensive HIV prevention together with health and social services, in addition to providing access to sterile injection equipment. Yet, syringe services program coverage remains low in much of the United States.[49] HIV prevention and care are best delivered together, and different services should be integrated as women who exchange sex face many health risks and follow-up can be difficult.[44] Services should also be accessible and nonjudgmental, as real or perceived mistreatment of women who exchange sex could affect their access otherwise.[40]

Limitations

The analysis is subject to several limitations. This analysis is cross sectional and causality may not be inferred. Second, RDS sampling weights were not used in our analyses; however, we account for the potential sampling biases by adjusting for recruitment chains in generalized estimating equation regression and by adjusting for PWID network size and the recruiters' value on the outcome. Finally, without a known sampling frame, generalizability to other women who inject drugs, even within the participating cities, is unknown. Women who exchange sex may be underrepresented in this study if they are especially hard to reach. However, the use of peer recruitment and allowing longer recruitment chains should minimize this selection bias.

CONCLUSIONS

This analysis of data collected from 20 US cities represents the largest study to date in the United States on exchange sex and HIV among women who inject drugs and demonstrates the unique HIV risks and prevention needs in this population. Increasing awareness of one's HIV status among this population is key to caring for those who are HIV positive and to prevent onward transmission to both exchange and nonexchange partners. Interventions for women who exchange sex should not only focus on injection-related, but also sexual HIV risk, and any barriers to accessing HIV prevention, testing, and care. Services for this population should also address the myriad of other needs associated with exchange sex, including substance use disorder treatment and mitigation of health consequences of socioeconomic disadvantage.

The NHBS Study Group

Refer to Web version on PubMed Central for supplementary material.

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For the full list of NHBS Study Group participants, please see Supplemental Digital Content, http://links.lww.com/QAI/B35.

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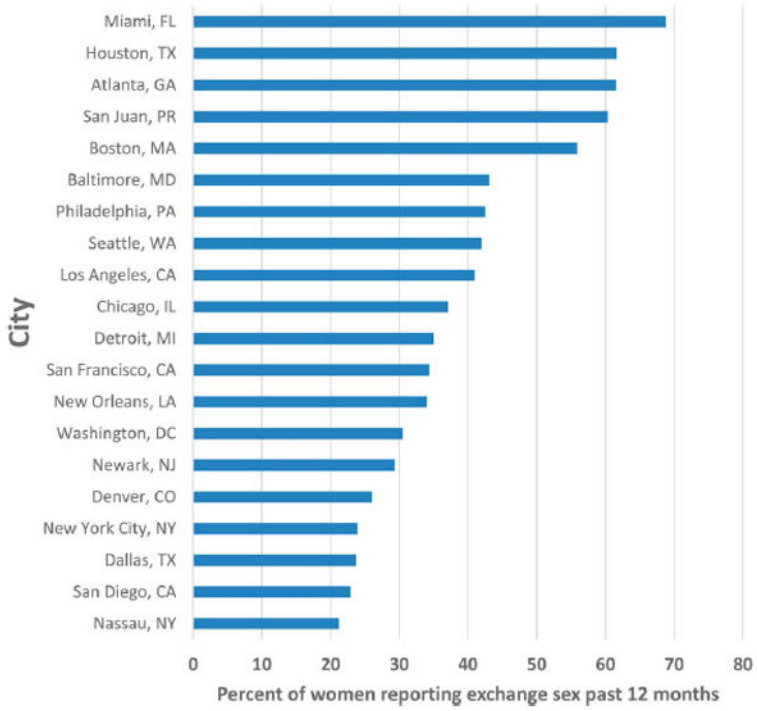

FIGURE 1.

Prevalence of exchange sex in the previous 12 months among women who inject drugs, by city, National HIV Behavioral Surveillance, 2009.

TABLE 1

Prevalence of Exchange Sex in the Previous 12 Months Among Women Who Inject Drugs, National HIV Behavioral Surveillance, 2009*

	Exchange Sex Prevalence		
	N	N (%)†	*P*
Total	2305	903 (39.2)	
Sociodemographics			
Age, yrs			0.008
18–24	134	46 (34.3)	
25–34	408	182 (44.6)	
35–44	629	270 (42.9)	
≥45	1134	405 (35.7)	
Race/ethnicity			0.29
Black	1009	380 (37.7)	
Hispanic/Latino‡	397	176 (44.3)	
White	768	298 (38.8)	
Other, including multiple races	126	48 (38.1)	
Education			0.03
Less than high school graduate	856	357 (41.7)	
High school diploma or equiv.	810	325 (40.1)	
Some college/technical/postgraduate	639	221 (34.6)	
Employment			<0.001
Full/part time	251	67 (26.7)	
Not working	2054	836 (40.7)	
At or below poverty§			0.1
Yes	1721	693 (40.3)	
No	559	203 (36.3)	
Health insurance			<0.001
Yes	1271	450 (35.4)	
No	1032	452 (43.8)	
Homeless (previous 12 mo)			<0.0001
Yes	1382	673 (48.7)	
No	922	229 (24.8)	
Incarcerated (previous 12 mo)			<0.0001
Yes	738	370 (50.1)	
No	1567	533 (34.0)	
HIV status			0.01
Negative	2111	813 (38.5)	
HIV-positive–aware	112	45 (40.2)	
HIV-positive–unaware	81	45 (55.6)	

Numbers might not add to total because of missing or unknown data.

[*] "Exchange sex" is defined as having received things like money or drugs in exchange for oral, vaginal, or anal sex from one or more male partners in the previous 12 months.

[†] Percentages are row percentages.

[‡] Hispanic/Latino participants may be of any race.

[§] Household income was dichotomized into at/below vs. above the federal poverty guidelines; poverty level for this variable was based on annual household income, adjusted for family size according to the DHHS 2008 poverty guidelines.

TABLE 2

Risk Behaviors, HIV Prevalence, and Use of Services Among Women Who Inject Drugs, by Exchange Sex Status, National HIV Behavioral Surveillance, 2009 *

	Exchange Sex, N = 903 (39.2%)	No Exchange Sex, N = 1402 (60.8%)	
	N (%)†	N (%)†	*P*
Sexual risk behaviors			
Number of vaginal condomless sex partners previous 12 mo			<0.0001
0–1	328 (36.5)	1078 (77.0)	
2–4	296 (33.0)	265 (18.9)	
5–9	105 (11.7)	43 (3.1)	
≥10	169 (18.8)	14 (1.0)	
Number of anal condomless sex partners previous 12 mo			<0.0001
0	602 (66.8)	1104 (78.9)	
1	186 (20.6)	252 (18.0)	
>1	113 (12.5)	43 (3.1)	
Number of oral, vaginal, or anal sex partners previous 12 mo			
Mean (95% CI)	63.3 (48.1 to 78.5)	2.6 (2.1 to 3.0)	<0.0001
Median (IQR)	7.0 (3.0 to 30.0)	1.0 (1.0 to 2.0)	<0.0001
Last male sex partner HIV status‡			<0.0001
Unknown	578 (67.4)	449 (33.7)	
Positive	7 (0.8)	23 (1.7)	
Negative	273 (31.8)	861 (64.6)	
Last sex partner ever injected drugs			<0.0001
Yes	436 (48.3)	971 (69.3)	
No	346 (38.3)	388 (27.7)	
Do not know	121 (13.4)	42 (3.00)	
Drug risk behaviors			
Years since first injection			0.002
0–3	74 (8.2)	180 (12.9)	
4–6	71 (7.9)	123 (8.8)	
≥7	753 (83.9)	1092 (78.3)	
Injection frequency			0.11
At least daily	726 (80.5)	1065 (76.0)	
Less than daily, but more often than monthly	136 (15.1)	222 (15.8)	
Monthly or less	40 (4.4)	115 (8.2)	
Receptively shared syringes previous 12 mo	498 (56.0)	461 (33.4)	<0.0001
Drug injected most frequently			0.04
Heroin	688 (76.2)	1117 (79.7)	
Cocaine	62 (6.9)	60 (4.3)	
Speedball (Heroin and cocaine together)	118 (13.1)	141 (10.1)	
Other	35 (3.9)	84 (6.0)	

	Exchange Sex, N = 903 (39.2%)	No Exchange Sex, N = 1402 (60.8%)	
	N (%)†	N (%)†	*P*
Noninjected crack cocaine use previous 12 mo	620 (68.7)	724 (51.7)	<0.0001
Noninjected methamphetamine use previous 12 mo	123 (13.6)	195 (13.9)	0.22
Binge drinking previous 12 mo	521 (57.8)	709 (50.6)	0.003
HIV status, testing, and health services			
HIV test result§			
HIV positive (aware and unaware)	90 (10.0)	104 (7.4)	0.33
HIV-positive–unaware	45 (5.0)	36 (2.6)	0.01
Tested for HIV previous 12 mo‖	477 (55.1)	699 (52.2)	0.46
If tested for HIV previous 12 mo, did not receive result‖	36 (7.6)	39 (5.6)	0.17
Visited any health care provider previous 12 mo	676 (74.9)	1097 (78.3)	0.01
Received HIV intervention (individual or group)	210 (23.3)	332 (23.7)	0.61
Received free sterile needles previous 12 mo	395 (43.7)	625 (44.6)	0.87
Alcohol or drug treatment previous 12 mo	316 (35.0)	478 (34.1)	0.94
Sexually transmitted disease diagnosis previous 12 mo	176 (19.6)	122 (8.7)	<0.0001

Numbers might not add to total because of missing or unknown data.

*"Exchange sex" is defined as having received things like money or drugs in exchange for oral, vaginal, or anal sex from one or more male partners in the previous 12 months.

†Percentages are column percentages.

‡Excludes participants who self-reported a previous HIV-positive test result.

§Women were considered to be HIV positive if they had a laboratory-confirmed–positive HIV test result. Of these, women who did not report having previously tested positive for HIV were considered to be HIV-positive–unaware.

‖Excludes participants who self-reported a previous HIV-positive test result, unless their first positive test was within the previous 12 mo.

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TABLE 3

Multivariate Analysis of Factors Associated With Being HIV-Positive–Unaware Among Women Who Inject Drugs, n = 2192, National HIV Surveillance, 2009

			HIV-Positive–Unaware*					
			Model 1			Model 2—Sensitivity Analysis		
	Total, N = 2192	% HIV-Positive–Unaware	aPR	95% CI	*P*	aPR	95% CI	*P*
Sociodemographic								
Age, yrs								
18–24	134	2.2	Ref			Ref		
25–34	395	1.3	0.36	0.08 to 1.71	0.20	0.34	0.07 to 1.61	0.17
35–44	586	5.6	1.29	0.31 to 5.34	0.72	1.29	0.31 to 5.33	0.72
≥45	1077	3.7	1.04	0.24 to 4.43	0.96	1.01	0.24 to 4.31	0.98
Race/ethnicity								
Black	936	4.7	2.29	1.04 to 5.07	0.04	2.39	1.08 to 5.31	0.03
Hispanic/Latino†	382	6.5	1.68	0.69 to 4.08	0.25	1.72	0.72 to 4.08	0.22
White	747	1.5	Ref			Ref		
Other, including multiple races	122	0.8	0.57	0.09 to 3.63	0.56	0.58	0.09 to 3.74	0.56
Education								
Less than high school graduate	803	5.2	1.94	1.07 to 3.53	0.03	1.89	1.05 to 3.40	0.03
High school diploma or equiv.	772	3.2	1.41	0.74 to 2.70	0.30	1.36	0.72 to 2.59	0.35
Some college/college/postgraduate	617	2.3	Ref			Ref		
Experienced homelessness previous 12 mo								
Yes	1313	3.1	0.53	0.34 to 0.84	0.007	0.53	0.33 to 0.83	0.005
No	878	4.7	Ref			Ref		
Sexual risk behaviors								
Exchange sex‡								
Yes	858	5.2	1.97	1.31 to 2.97	0.001	1.78	1.13 to 2.81	0.01
No	1334	2.7	Ref			Ref		
Total number of condomless vaginal and anal sex partners previous 12 mo								
0	257	5.1				Ref		
1–4	1548	3.1				0.69	0.37 to 1.29	0.25

			HIV-Positive–Unaware*					
			Model 1			Model 2—Sensitivity Analysis		
	Total, N = 2192	% HIV-Positive–Unaware	aPR	95% CI	*P*	aPR	95% CI	*P*
5–9	182	4.4				0.95	0.49 to 1.84	0.87
>9	196	6.1				1.13	0.46 to 2.77	0.78

Participants who self-report being HIV-positive are excluded.

*Women were considered to be HIV-positive if they had a laboratory-confirmed–positive HIV test result. Of these, women who did not report having previously tested positive for HIV were considered to be HIV-positive–unaware.

†Hispanic/Latino participants may be of any race.

‡"Exchange sex" is defined as having received things like money or drugs in exchange for oral, vaginal, or anal sex from one or more male partners in the previous 12 months. aPR, adjusted prevalence ratio.